Biological Safety
at the
University of Manitoba
September 2013
Presentation Overview

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Responsibilities for Biosafety
External Stakeholders

Public Health Agency of Canada (PHAC)

The Public Health Agency of Canada (the Agency) is the national authority on biosafety and biosecurity for human pathogens and toxins. For many years, the primary tools applied by the Agency’s Pathogen Regulation Directorate (PRD) were the *Human Pathogens Importation Regulations (External link)* (HPIR), which include inspecting and certifying laboratories importing human pathogens and toxins into Canada, and the *Laboratory Biosafety Guidelines*.

In 2009, the *Human Pathogens and Toxins Act (External link)* (HPTA) became the newest tool at the Agency’s disposal to promote biosafety and biosecurity. The HPTA expands the Agency’s ability to reduce the risks posed by human pathogens and toxins by standardizing controls over activities involving these agents, whether they are imported or domestically acquired.

Under the Human Pathogens and Toxins Act the U of M is required to register and annually verify all locations that use Risk Group 2-3 biological agents and specific toxins. U of M does not have facilities to work with Risk Group 4 agents. Although not exhaustive, Schedules 1-4 of the HPTA provide a list of toxins and Risk Group 2-4 biological agents.

NEW!! In July 2013, the *Canadian Biosafety Standards and Guidelines (CBSG)* replaced the *Laboratory Biosafety Guidelines*. The CBSG 2nd Edition will be coordinated with, and correspond to, the full implementation of the HPTA. The HPTA is scheduled for release in 2015.

*More on the CBSG to follow...*
External Stakeholders

Canadian Food Inspections Agency (CFIA)

The CFIA is dedicated to safeguarding food, animals and plants, which enhances the health and well-being of Canada’s people, environment and economy. The Agency is responsible for the administration and enforcement of legislation related to food, animals and plants. Similar to work with human pathogens, permits are required for the importation of all animal pathogens and plant pests into Canada.

As of April 1, 2013, the Public Health Agency of Canada (PHAC) is now the single window for stakeholders who require an import permit for both human and terrestrial animal pathogens. The CFIA continues to issue permits for animal pathogens that are not indigenous to Canada (pathogens causing foreign animal and emerging animal diseases), aquatic and plant pathogens as well as for animals, animal products and by-products, tissue, sera and blood that are infected with animal pathogens.

NEW!! In July 2013, the Canadian Biosafety Standards and Guidelines also replaced the Containment Standards for Veterinary Facilities and the Containment Standards for Laboratories, Animal Facilities and Post Mortem Rooms Handling Prion Disease Agents as well as the Laboratory Biosafety Guidelines.

Containment Standards for Facilities Handling Plant Pests,

Containment Standards for Facilities Handling Aquatic Animal Pathogens.
External Stakeholders

**Transportation of Dangerous Goods - TDG**

Persons who ship receive or transport dangerous goods by ground (truck) must be certified for the ground transport for dangerous goods. Past attendees to this course have also included laboratory staff that routinely ship materials by truck. Certification is valid for 3 years.

**IATA – International Air Transport Association**

Persons who ship or receive dangerous goods by air need to be certified for the air transport of dangerous goods. Typical course attendees include laboratory staff that ship medical samples by air (medical samples and dry ice are both regulated as dangerous goods). Ground transport training is not required provided that the ground transport is limited from the shipping location to the air carrier’s depot. However shipping or receiving any dangerous goods by air requires certification. Certification is valid for 2 years.

The Environmental Health and Safety Office (EHSO) offers two one-day courses in dangerous goods for ground transport and air transport respectively. These courses are available to University workers only, at no cost to the participants or departments.

**Link to info on EHSO TDG training**
External Stakeholders

City of Winnipeg Water and Waste By-laws
http://www.winnipeg.ca/waterandwaste/dept/default.stm

Most specifically: Bio-Medical Waste Sharps Bylaw No 6001/92

- We all have a responsibility to ensure that others and the environment are not exposed to these hazards.
- Waste disposal is also important in that it brings together the original users of the biological agents with the Physical Plant staff that enter the lab areas and the environment where these materials may ultimately be disposed.
- Landfill and waste disposal guidelines are most often civic responsibilities. Practices can vary greatly not only from country to country but also between provincial and civic jurisdictions.
- It is always to important to confirm what the local institutional biohazardous disposal requirements are.

Refer to the University of Manitoba Biohazardous Waste Disposal Guidelines:

*Biohazardous Waste Disposal Chart*

*U of M Biosafety Guide 2012*. Section 8.6
External Stakeholders

Manitoba Provincial Workplace Safety and Health Act (WS&H Act)

The Act is based on the concept of an **INTERNAL RESPONSIBILITY SYSTEM**. This means that *everyone* at the workplace be they employers, supervisors, workers, students, contractors or self employed persons, all *share a responsibility for the health and safety of all persons at the workplace*.

The WS&H Act provides the following **Four Basic Rights**:
- **Right to know** about hazards (WHMIS)
- **Right to refuse** dangerous work
- **Right to protection from discrimination** re: safety and health matters
- **Right to participate** in safety activities (through safety committees).

The box below also provides a link to the actual provincial regulations.

**Provincial Workplace Safety & Health Act**
External Stakeholders

WS&H Act: Right to Know about the Hazards - WHMIS

WHMIS Key Elements are: MSDSs, Education, Labeling

- WHMIS education is mandatory for persons working with Chemical and Biological material in labs at the U of M. Contact your Departmental WHMIS coordinator for comprehensive training on WHMIS.
- Information is also available on the EHSO Chemical Safety web-site.
- Biological agents that are human pathogens (Risk Group 2-4) are included as one of the six WHMIS hazard classes. This training provides you with the WHMIS education as it relates to biological agents.
- Risk Group 2-4 biological agents require a Pathogen Safety Data Sheet (PSDS). The PHAC maintains a PSDS for approximately 200 RG2 and 3 biological agents.
External Stakeholders

WS&H Act: Right to Know about the Hazards - WHMIS

Class D: Poisonous and Infectious
Division 3 – Biohazardous Infectious Material

Risks:

Systemic damage with accidental or prolonged exposure

Damage could include:

- Acquiring a disease or infection
- Activation of cancer formation
- Sensitization to allergies
External Stakeholders

**WS&H Act: Right to Refuse Dangerous Work**

You have the right to refuse to do work that you consider to be unsafe.

When an employee believes on reasonable grounds that a task constitutes a danger to their health and safety or the health and safety of any other person in a workplace they may refuse to do that work.

The University will follow the requirements of section 43 "Right to Refuse Dangerous Work" of the *Manitoba Workplace Safety & Health Act.*

*Follow the steps in the U of M Procedure: Response to Health and Safety Concerns. Link follows.*

**U of M Procedure: Response to Health and Safety Concerns**
Follow the sequence below:

1. Report the concern to your direct supervisor for resolution;
2. If not resolved, then you may contact any member of the local area safety committee associated with your workplace;
3. If not resolved, then the following may be contacted:
   - your bargaining unit or
   - Workplace Safety and Health Division of the Manitoba Department of Labour and Immigration

EHSO provides technical expertise regarding workplace safety and health issues.

For more information on the four basic rights and general workplace health and safety at the U of M, visit the

EHSO General Information web-site
@ the U of M

University of Manitoba Policy on Health and Safety

The University shall comply with requirements of any applicable WS&H legislation, provide a safe & healthy environment so far as is reasonably practicable and to minimize workplace illness & injury.

In addition to the general Health and Safety Policy and the Biosafety Policy and Procedure, the following Procedures are applicable to labs using biological material:

- **Minor in Laboratories**
- **Immunization Standard**
- **Laboratory Safety Procedure**
- **Working Alone Procedure**
- **Response to Health and Safety Concerns**

To achieve this, roles and responsibilities for all health & safety shall be an integral part of the duties of all parties.
Supervisors / Principal Investigator
(including anyone who directs the work of others)
From University of Manitoba Governance, Safety Management Procedure, June 21, 2011

- Accept responsibility for health and safety in the workplace(s) that they supervise by taking all steps reasonable to:
  - Protect the safety and health of employees under their supervision
  - Ensure workers are aware of safety and health hazards in their workplace and the practices to minimize those hazards (adequate safety equipment and safety training)
  - Ensure that employees follow the procedures
- Receive and act on employee concerns about safety;
- Ensure that accidents and injuries are reported and investigated;
- Ensure that visitors to their workplace(s) are aware of hazards associated with their workplace(s) and are properly equipped;
- Do such things as required to comply with all policies and procedures

U of M Health and Safety Policy
U of M Health and Safety Procedure- Laboratory Safety Training Standard
@ the U of M

Employees and Students

University of Manitoba employees and students are required to:

• use reasonable care to protect your own safety and the safety of others

• immediately report any accident, injury or safety concern to the principal investigator/appropriate supervisor, or for students, the appropriate instructor or faculty member

• properly use and care for personal protective equipment

• follow safety and health rules and procedures established by the Department/Unit Head and Principal Investigator/supervisor

• employees should consult and cooperate with the Local Area Safety and Health Committee

U of M Health and Safety Procedure: Students

U of M Health and Safety Procedure: Employees
It is the responsibility of EHSO to assist all members of the University community in meeting their safety and health responsibilities by:

- Identifying emerging trends and internal/external risks that may affect specific areas or the University as a whole;
- Identifying and evaluating options to deal with risks and providing recommendations for consideration;
- Providing expertise, advice, guidance, technical support, and training;
- Recommending and developing safety and health initiatives, systems, programs and approaches;
- Recommending metrics so that progress or performance can be monitored.

EHSO Website:
U of M homepage > UM info > Search “safety office”
EHSO Location and Staff

Fort Garry office
John Van Delden - Director ................................................................. 474-9290
Pearl Novotny – Administrative Assistant ........................................ 474-6633
Terry Neufeld – Office Assistant .......................................................... 474-9031
Alison Reineke – Occupational Hygiene/Chemical Safety Consultant...... 474-7970
Joey Bellino – Assistant Environmental Management Coordinator ....... 474-6970
Judy Shields - Occupational Health/Biosafety Coordinator .................... 474-6438
Kevin Chapdelaine- Life Safety Consultant .......................................... 474-6633
Ed Pschulski – Facilities Safety Consultant ........................................ 480-1823

Bannatyne office
Steven Cole – Biosafety Officer(BSO) Animal Care Occ Health .............. 789-3675
Evelyn Froese – Biosafety Specialist...................................................... 789-3477
Leona Page – Radiation Safety Coordinator ........................................ 789-3613
Alison Yarmill– Assistant Radiation Safety Coordinator ....................... 789-3359
vacant– Laboratory Safety Program Assistant ..................................... 789-3654

Main Office Phone: 474-6633
Bannatyne Campus: T248 Old Basic Science
Fort Garry Campus: 191 Extended Education Complex
Biosafety & Biosecurity
Principles of Laboratory Biosafety

Goals of Biosafety

- The prevention of personal, laboratory and environmental exposure to actual or potentially infectious agents or biohazards by the application and integration of knowledge, techniques and equipment into your daily lab work.

- Classification of biological agents according to risk and laboratories according to use to optimize safety and economy.

- All the regulators are in agreement in requiring adequate training before personnel are allowed to work independently with hazardous material.
Principles of Laboratory Biosafety

Canadian Biosafety Standards and Guidelines (CBSG)

• In Canada, the CBSG applies to facilities where imported or domestically acquired human and terrestrial animal pathogens or toxins are handled or stored. This includes possessing, handling, using, producing, storing, permitting access to, transferring, importing, exporting, releasing, disposing of or abandoning such material.

Canadian Biosafety Standards and Guidelines (2013)

• The Pathogen Regulation Directorate, PHAC and the Office of Biohazard Containment and Safety, CFIA have developed e-learning training modules that cover the basic concepts in Biosafety in support of the CBSG.
Principles of Laboratory Biosafety

Canadian Biosafety Standards and Guidelines (CBSG)

• Released July 2013, the Canadian Biosafety Standards And Guidelines replaces:
  – the PHAC “Laboratory Biosafety Guidelines”
  – the CFIA “Containment Standards for Veterinary Facilities”.
Principles of Laboratory Biosafety

Canadian Biosafety Standards and Guidelines (CBSG)

- **Part I (The Standards)** sets out the *physical containment* and *operational practice* requirements for facilities where ‘infectious material’ are handled or stored.

- **Part II (The Guidelines)** provide further guidance on how best to achieve the biosafety requirements outlined in Part I.

- **The Transition Index**, between Part I and Part II provides a rationale for the requirement in Part I and provides a link to Part II, where further guidance can be found on how to best achieve the biosafety requirement.

Link to CBSG
Let’s now go to the **e-Learning Portal**!

You will need to register a user name, password and email address to log-in to the modules.
Principles of Laboratory Biosafety

- Under the Course Categories select ‘Laboratory Biosafety and Biosecurity /Principles of Laboratory Biosafety’.
- Only select modules are required to be viewed. They are listed on the next slide.
- Further along in this presentation, the slides in Section: Biosafety & Biosecurity @ the U of M, reflect the University of Manitoba Biosafety Program requirements that have been put in place in support of the principles of biosafety and current regulations and guidelines for biosafety.
Principles of Laboratory Biosafety

The Biosafety Quiz is pulled from the following modules:

1. Microbiology Overview:
2. Pathogen Risk Assessment
3. Laboratory Acquired Infections
4. General Safety for Containment Laboratories
5. Containment Level 2 Operational Practices
6. Personal Protective Equipment
7. Biological Safety Cabinets
8. Decontamination in the Laboratory
9. Chemical Disinfectants
10. Autoclaves
11. Introducing Biosecurity
Principles of Laboratory Biosafety

• When you have completed the e-learning modules, and the remaining slides in this presentation, you must also complete and submit a hard-copy of the U of M Biosafety Quiz found on the EHSO Biosafety Program web-site.

   It will be helpful to open and answer the questions in the quiz as you work along the e-learning modules and the slides in this presentation.

• To pass the quiz you must obtain a grade of 80% or better. Information on where to submit the completed quiz is found at the end of this presentation.

• Don’t forget to complete and submit the Biosafety Quiz.
Principles of Laboratory Biosafety

If you have not already logged-in, do so now: e-Learning Portal

It is highly recommended that before or after you have completed the modules and the remaining slides in this presentation, you also watch the two videos found in the e-learning modules under the link at Instructional Videos on Biosafety. These will really pull together all the concepts covered in the modules. The videos are called:

- Biosafety 101
- Containment Level 2 Laboratory: Operational Practices

Additionally you may be interested in the video ‘Containment Level 3 Laboratories: Operational Practices’. There is only one Containment Level 3 laboratory at the University of Manitoba.
Pathogen Risk Assessments:

Biosafety Permits

For purposes of the U of M Biosafety Procedure, *Biological hazards* or *biologically hazardous* shall refer to any hazard which originates with the use of viruses, bacteria, fungi, recombinant DNA molecules, cells or tissue cultures or any other potentially infectious material at the University of Manitoba. The following should all be considered to be included in the list of material to be registered in a Biosafety Permit:

- Cultured animal cells and the potentially infectious agents which these cells may contain.
- Primate body fluids and other potentially infectious clinical specimens.
- Tissue or microbial cultures, and materials contaminated by such cultures, stocks or specimens of micro-organisms.
- Containers or materials saturated with blood products.
- Parasites
- Allergens
- Tissue from experimental animals including animal dander.
- Plant viruses, bacteria, fungi.
- Toxins (bacterial or plant).
- Vaccines
- Human anatomical waste (body parts or organs).
- Animal anatomical waste (carcasses, body parts, organs).
Biosafety @ the U of M

Pathogen Risk Assessments:
Biosafety Permits and Biological Agents Inventories

• All Principal Investigators/ responsible owners of biological agents must hold a current U of M Biosafety Permit. Permit conditions require that an inventory of all Risk Group 1-3 biological agents and toxins must be maintained. The inventory must indicate the risk group of the pathogen and the containment level at which the intended work will take place.

• Pathogen Safety Data Sheets and HPTA schedules can assist with this. These lists are non-exhaustive; that is, a pathogen that is not found in the list may require a more detailed pathogen risk assessment to determine its risk group.

• Use or storage of Risk Group 4 biological agents is not allowed in any U of M-owned buildings.

• The Human Pathogens and Toxins Act -2009 (HPTA) requires the U of M to report the location of use/storage of any Risk Group 2-4 human pathogens. **HPTA: Schedules 2-4** lists biological agents corresponding to Risk Groups 2-4. T

• Toxins which are the by-products of micro-organisms are also included in the Act. **HPTA: Schedule 1** provides a specific list of the toxins that are included.
Biosafety @ the U of M

Pathogen Risk Assessments:
Pathogen Safety Data Sheets

- **@ the U of M**: WHMIS requires a PSDS for all Risk Group ≥2 pathogens. If one is not available for the pathogens used in your lab, you will need to develop one.

- PHAC and CFIA have developed **Pathogen Safety Data Sheets (PSDSs)**, which are technical documents describing the hazardous properties of human pathogens and providing recommendations for lab work with these agents.

- PSDSs do not replace the need for a local risk assessment and standard operating procedures for your lab. They may be used as an additional resource.

- This list of PSDSs is non-exhaustive; that is, a pathogen that is not found in the list may require a more detailed pathogen risk assessment to determine its risk group.
The following Infectious Material Hazard Assessments, Safe Work Practices & Risk Assessment Worksheets are available on the Biosafety Program web-site to assist researchers with their Local Risk Assessments:

- Human Blood and Body Fluid Risk Assessment Worksheet
- Human and Animal Cell Culture Risk Assessment Worksheet
- Microorganism Risk Assessment Worksheet

The **Biosafety Guide** and accompanying appendices also provide additional recommended or required SOPs and Safe Work Practices for researchers in U of M labs.
Biosafety @ the U of M

Pathogen Risk Assessments:
LAIIs – Know the Symptoms and your Health Status

Everyone should be familiar with the symptoms caused by the infectious material being handled and immediately notify their supervisor and health care provider of any symptoms or illness that *may* have been caused by the infectious material being handled.

Any changes to your health status that decreases your immuno-competence should also be reported to your supervisor.

Ensure that your health care provider is aware of your occupational contact with infectious material.

It is critical that all accidents and potential incidents are reported and investigated. This is important so that future accidents can be prevented and co-workers are not exposed.
Pathogen Risk Assessments: 
Preventing LAIs – Immunizations @ the U of M

- The principle of Universal Precautions assumes that all human blood and some body fluids are assumed to be positive for any blood-borne pathogens (e.g. HIV, Hepatitis B or C). The expectation is that all work is done with these materials according to Containment Level 2 facility design and operational practices of the Canadian Biosafety Standards and Guidelines.

- If you are expected to work with human samples or with animals, you should be immunized against Hepatitis B and Tetanus / Diphtheria respectively.

- See your supervisor or contact the Occupational Health Coordinator (EHSO-474-6438) to obtain vaccination information about these or other vaccine-preventable pathogens. Refer also to the information in the following documents.

Working with Human Blood, Tissue, Body fluids
Working with Human and Animal Cell Cultures
U of M Immunization Standard
Biosafety @ the U of M

Pathogen Risk Assessments:
Responding to LAIs - U of M Post- Exposure Protocol

• Your Pathogen Risk Assessment will help determine by which routes your infectious material is transmitted and which procedures may require special or additional consideration and safe work practices to prevent worker exposure. These should be documented in your lab’s safety manual and include specific steps to follow in-case of an exposure.

• Print and post the U of M Post Exposure Protocols. Note that there is a separate poster/protocol for each campus (2012).

Remember! Seek medical attention within 2 hours, especially if you have been exposed to human blood or body fluids.

• At the Fort Garry Campus this may require going to Victoria Hospital Emergency or to the Health Sciences Centre Emergency at Bannatyne Campus.

Fort Garry Post Exposure Protocol
Bannatyne Post Exposure Protocol
Responding to LAIs: Post-Exposure Protocols @ U of M (2012)

BANNATYNE CAMPUS POST – EXPOSURE PROTOCOL

Exposure protocol applies to puncture wounds due to contaminated needles or sharp instruments, a splash of Blood/Body Fluids, hazardous chemicals or biological agents into the eyes, mouth or non-intact skin, bites and/or scratches.

PROCEDURE
1. Get immediate First Aid
   - For needle stick injuries:
     - encourage bleeding of injury site
     - wash injury site thoroughly with soap and water
     - cover area with sterile dressing if necessary
     - consult MSDS/PSDS if applicable
   1.1. If eye/mucousa splash:Flush with water for 15 minutes
        Consult MSDS/PSDS if applicable
2. Report incident to supervisor
3. Seek medical advice within 2 hours, bringing immunization records if possible, applicable MSDS/PSDS, this Protocol and any other information which will detail the hazards of the agent to which you have been exposed. Contacts for medical advice are as follows:

BANNATYNE CAMPUS STAFF
For human blood/body fluid exposures, call OESH (787-3312) stat. in case of emergency call 911. If no response proceed to HSC Emergency for assessment within 2 hrs of exposure.
For all other exposures report to HSC Emergency Department within 2 hours.

Please contact the Occupational Health Coordinator the next day @ 474-6438 & complete a green card, notice of injury form.
Link to Green Card notice of injury form:

FORT GARRY CAMPUS POST – EXPOSURE PROTOCOL

Exposure protocol applies to puncture wounds due to contaminated needles or sharp instruments, a splash of Blood/Body Fluids, hazardous chemicals or biological agents into the eyes, mouth or non-intact skin, bites and/or scratches.

PROCEDURE
1. Get immediate First Aid
   - For needle stick injuries:
     - encourage bleeding of injury site
     - wash injury site thoroughly with soap and water
     - cover area with sterile dressing if necessary
     - consult MSDS/PSDS if applicable
   1.1. If eye/mucousa splash:Flush with water for 15 minutes
        Consult MSDS/PSDS if applicable
2. Report incident to supervisor
3. Seek medical advice within 2 hours, bringing immunization records if possible, applicable MSDS/PSDS, this Protocol and any other information which will detail the hazards of the agent to which you have been exposed. Contacts for medical advice are as follows:

FORT GARRY CAMPUS STAFF
Proceed to Victoria General Hospital Emergency Department for assessment within 2 hrs of exposure.
Victoria General Hospital
2340 Pembina Hwy
Winnipeg, MB

Please contact the Occupational Health Coordinator the next day at 474-6438 & complete a green card, notice of injury form.
Link to Green Card notice of injury form:

Remember to file an Incident Report!
Biosafety @ the U of M

Pathogen Risk Assessments:
Accident and Incident Reporting @ the U of M

- Provincial Workplace and Health Legislation requires that all accidents, incidents and near misses shall be investigated and a report completed.

- Follow this link to the U of M information on incident reporting. Supervisors/departments are responsible for ensuring that incidents are investigated and steps put in place to prevent re-occurrence.

- Incidents include the following:
  - personal injury (including needle sticks)
  - occupational illness
  - fire/explosion
  - property and equipment damage
  - environmental damage
  - near miss incidents (those incidents that could have resulted in any of the above losses)
Biosafety @ the U of M

Pathogen Risk Assessments:
U of M Accident and Incident Reporting

Staff and Students:
• Report the incident to your supervisor immediately: verbally or using the **Employee’s Green Card-Notice of Injury Form** available on EHSO web-site.
• If required, seek medical attention immediately.
• Make sure to tell your supervisor of the visit.

Additionally for staff only:
• Complete the **Employee’s WCB Report**. It can be faxed directly to WCB.
• Your supervisor must complete an **Employer’s Report** and fax it within 24 hrs to the EHSO if you consulted a health care professional with respect to your accident.
• Both forms and complete responsibilities can be found on EHSO web-site.
• Containment levels refers to the minimum physical containment and operational practices required for handling biological agents or toxins safely in laboratory and animal work environments.

• The physical containment requirements cover items like:
  – Structure and location of containment zone
  – Containment barrier (floors, walls, doors, ceilings etc.)
  – Surface finishes and casework
  – Facility services (plumbing, electrical, gas etc.)

• The operational practice requirements cover the following items:
  – Biosafety Program Management
  – Entry and exit of Personnel, Animals and Materials
  – Training Program
  – Decontamination and Waste Management
  – Certification Checklist and Performance and Verification Testing

• The containment level (CL) and risk group of the pathogen are generally the same (e.g., RG2 pathogens are handled at CL2), but there are some exceptions. Additionally, not all biological material will fall perfectly into a given risk group or containment level.
It is important to perform a Local Risk Assessment to determine the appropriate level of precautions to be taken within a containment zone. The following factors are considered when determining the specific physical and operational requirements for handling a pathogen:

- **Aerosol Generation**
- **Quantity and type of container**: e.g. test tube or large vessel
- **Concentration of Pathogen**: diagnostic serum sample or cultured /concentrated?
- **Type of work**: in vitro or in vivo, large scale
- **Shedding from infected animals**.

For biological material that may harbour pathogens (e.g., tissues), toxins, prions, or modified components of a pathogen a more detailed hazard assessment of items should be considered when performing local risk assessments. Refer to the PHAC e-learning modules and CBSG Part II 4.3 for further considerations for the following:

<table>
<thead>
<tr>
<th>Toxins</th>
<th>rDNA</th>
<th>Non-indigenous Infectious pathogens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell lines</td>
<td>Parasites</td>
<td>Autologous cells, tissues and specimens</td>
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<tr>
<td>Viral vectors</td>
<td>Primary specimens</td>
<td></td>
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<tr>
<td>Prions</td>
<td>RNA Synthetic biology</td>
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Biosafety @ the U of M

Containment Level Assessments:
Containment Level 1

- Containment Level 1 (CL1) is a basic laboratory with features that provide the foundation for all containment laboratories. Biosafety is achieved through a basic level of operational practices and physical design features.
- Typical activities include for example,
  - Culturing non-pathogenic strains of E.coli or other risk group 1 pathogens
  - Physiological studies of with normal, facility bred rodents
- Activities with Risk Group 1 pathogens are not regulated by the PHAC and the CFIA and therefore the specific physical containment and operation practice requirements for this level are not provided in Part I (The Standards) of the CBSG.
- Although RG1 biological material only poses a low risk to the health of individuals and/or animals and the CBSG does not specify the requirements for these activities, due care should be exercised and safe work practices (e.g. good microbiological laboratory practices) should be followed when handling these materials.
- Local Risk Assessments (LRAs) are required and must be reviewed to determine the impact of any pathogen modifications or when the original conditions of use have changed.
- @ the U of M, PIs working with RG1 biological agents must register their work with these agents by applying for a Biosafety Permit.
Certain elements of the CBSG can be used as best practices for CL1 areas and have been identified and provided in the CBSG, Part II (The Guidelines), Chapter 4. Key elements include:

- a well-designed and functional space
- cleanable work surfaces
- use good microbiological practices;
- conduct Local Risk Assessments on activities to identify risks and to develop safe work practices
- provide training
- use PPE appropriate to the work being done
- employ proper animal work practices.
- cleanliness and tidiness - keep laboratory and animal work areas clean; maintain an effective rodent and insect control program
- decontaminate work surfaces appropriately, in accordance with biological material in use
Biosafety @ the U of M

Containment Level Assessments:
Containment Levels (CL) 2

• **Containment Level 2** (CL2) builds upon the basic laboratory foundation established for CL1.

• Biosafety and Biosecurity are achieved through operational practices and physical containment requirements that are proportional to the risks associated with the agents being handled therein.

• **CBSG Part I (The Standards)** sets out the physical containment (Chapter 3) and operational practice requirements (Chapter 4) for facilities where ‘infectious materials’ (Risk Group 2-4) are handled or stored. That is, for CL 2-4.

• @ the U of M, approximately two-thirds of the permit holders at the U of M work at CL2.

• U of M Biosafety Permit holders are required to follow the CBSG. The specific CBSG physical containment and operational practices for CL2 have been compiled into the document link below. Print a copy for your records and implementation.

**Containment Level 2 Physical Containment and Operational Practice requirements**
**Containment Level Assessments:**

**Containment Levels (CL) 3-4**

- **Containment Level 3**
  - Biosafety and Biosecurity are achieved through comprehensive operational practices and physical containment requirements.
  - CL3 requirements include stringent facility design and engineering controls.
  - At CL3, access is strictly controlled; all work is done in a BSC, and there is HEPA filtration of exhaust air.
  - There is only one CL3 lab at the U of M and it is currently certified to only work with non-aerosol transmitted Risk Group 3 pathogens.

- **Containment Level 4**
  - CL4 requires a highly complex facility design, maximum engineering controls, specialized biosafety equipment and redundant biosafety features.
  - CL4 requires maximum operational practices that build on those required at CL3. The researcher is completely isolated from the pathogen through positive-pressure suits for personnel or the use of a Class 111 BSC.
  - There is only one CL4 in Canada.
Biosafety @ the U of M

Containment Assessments:
Shared Lab Spaces

- Work with RG1 and RG2 agents is often undertaken in the same lab workspace/room.
- Work must be done following the facility design and operational requirements of the highest containment level.
- LRAs will help determine appropriate, training, access and entry requirements, PPE, waste management practices, etc. for everyone working and entering the containment zone.
- @ the U of M recommendations for shared lab work areas have been developed. See the link

Responsibilities in Shared Labs
Biosafety @ the U of M

**Containment Level Assessments:** Importing biological agents

- An import permit is required for all persons wishing to import Risk Group 2-4 human and terrestrial animal pathogens. *Human Pathogens Importation Regulation (HPIR)*
- In addition to the import permit application, applicants must provide validation of a certified facility which is at the appropriate containment level for work with the imported agents and intended procedures.
- At CL2, a **Containment Level 2 Compliance Letter** (CL2 checklist) from the PHAC is required. At the higher containment levels, a facility certification requires a site-visit and extensive documentation.
- The signature of the U of M Biological Safety Officer (BSO) is required for import permits and facility certifications.
- For importing plant pests and aquatic animal pathogens, import permit applications are also required by CFIA. Refer to the links below.

Plant Pests (& Pathogens) Imports, Aquatic Animal Imports.
Biosafety @ the U of M

Containment Operational Practices:
The U of M Biosafety Program

A Biological Safety Program has been developed to ensure the required level of control without unduly hampering research. The program is administered by the Environmental Health and Safety Office (EHSO) under the guidance of a Biological Safety Advisory Committee (BSAC).

• To identify the University's commitment to and responsibility for the safe use of biological materials and agents the university has adopted a Biosafety Policy.
• The Biosafety Procedure provides details on how this will be achieved including duties for the BSAC, requirement for an Institutional Biosafety Officer (BSO), issuance of Biosafety Permits to register work with biological agents and Biosafety Project Approval Certificates for the safety review of the proposed projects and release of Grant funds.
• Details on the permit process and links to regulatory agencies and resources can be found on the Biosafety Program Web-site and in the U of M Biosafety Guide 2012 (this manual is being revised to meet the new CBSG)
This presentation coupled with the e-learning modules training does not provide adequate information for new lab personnel to work independently in the lab.

Your supervisor is responsible for providing effective and documented site-specific training and evaluation of competence before you can work independently with the biological agents, procedures and safety equipment in use in your lab.

The Laboratory Safety Checklist for New Lab Personnel can be used for documenting the training.

For more information on generic and site-specific training refer to Section 8.1 in the U of M Biosafety Guide (2012)

The U of M Biosafety Guide and Appendices are available on the EHSO Biosafety Web-site. Bookmark it now, so that you have it available for reference.
Containment Operational Practices:
Access Control – (WHIP is Currently Under Review)

Workplace Hazard Information Placard

PHAC requires that Containment Level 2 and greater labs must display appropriate biohazard warning signage (including the international biohazard warning symbol, containment level, name and telephone number(s) of contact person, and entry requirements).

Signage is to be posted at the containment zone point(s) of entry (CBSG Part 1).

The Workplace Hazard Information Placard (WHIP) has until now been the standardized format for communicating hazards and contact information in U of M labs.

- CL 1 labs will show a box with only CL1 displayed.
- CL 2 labs will show the Biohazard sign and CL2 displayed.

Some locations may also display a RED BORDERED placard. These will indicate an additional hazard, cautionary statement or have special entrance requirements that will need to be followed.

Previously a WHIP sign was required for each room, or the corridor entrance for each room where biological agents were used or stored. The WHIP program is currently under review. Please stay tuned for updates.
Lab coats protect your clothes and your skin in the event of a reagent spill. They also help you avoid bringing contaminated clothing into your home. You:

- **Must** wear them when working with controlled products.
- **Should** wear them at all times when in the lab.
- **Do Not** wear lab coats (and gloves) in the following areas:

  - All offices, bathrooms, elevators, public hallways
  - Coffee/lunch rooms, departmental libraries
  - Student carrel area outside of the lab
  - Other non-lab areas of the building.
Gloves: Types and Characteristics

- **Latex**: a natural rubber
  
  resists water, acids, alkalis, salts, ketones

- **Nitrile**: a synthetic rubber
  
  better chemical protection, superior puncture and abrasion protection, better electrostatic dissipation

- **Neoprene**: a synthetic rubber
  
  superior chemical protection, good for handling acids, caustics, alcohols, solvents

- **Vinyl**: polyvinyl chloride
  
  short-term protection against acids, caustics and alcohols

- **Combination gloves**: 
  
  latex & nitrile
  neoprene & latex
  latex & nitrile & neoprene

- **Heat & Cold resistant gloves**
Biosafety @ the U of M

Containment Operational Practices: Personal Protective Equipment

Gloves: Selection and Use

DO NOT WEAR GLOVES IN THE LAB WHEN TOUCHING:

- Door knobs
- Computer keyboards
- Telephones or cell phones
- IPODS including earphones

• Always wear when working with infectious agents!
• Always wash your hands after removing your Gloves!
• Choose a glove that is appropriate for the task / chemical.
• Consult MSDS for any glove specifications.
• Consult supplier glove charts or check directly with manufacturer if unsure.
• Check for pin holes in gloves before putting them on.
• Change disposable gloves often.
**Gloves: Recommendations**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Protection Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>For tissue culture</td>
<td>4-6 mil latex or nitrile <strong>disposable</strong> glove</td>
</tr>
<tr>
<td>Handling toxic chemicals</td>
<td>Nitrile, neoprene or combo as appropriate for chemical, <strong>check MSDS</strong>.</td>
</tr>
</tbody>
</table>
| Handling corrosive chemicals or solvents | **Reusable**, chemically resistant, thick gloves, usually greater than 10 mil –nitrile, neoprene or combo-depending on contact time and concentration of chemical, **check MSDS**.  
There is one brand of disposable 8 mil nitrile gloves that offers dexterity and some chemical resistance. Contact EHSO for more info. |
| Working with RNA               | 4-6mil latex or nitrile disposable gloves                                         |
| Removing items from the –80 C freezer or liquid nitrogen | Thermal resistant gloves                                                        |
| Handling hot solutions or items| Thermal resistant gloves                                                             |
Glove Examples

Disposable Nitrile

Reusable Chemically Resistant

Heat and Cold Resistant

Disposable Latex
Eye Protection / Goggles

- Eye protection should be worn at all time in the lab areas but it **must** be worn when:
  - retrieving samples from liquid nitrogen
  - working with UV light (UVA&B filtering face shield)
  - doing radioactive work
  - handling caustic or dangerously reactive chemicals
  - cleaning chemical spills (non-vented goggles)
  - working with lasers

- Consult with your supervisor to ensure that the available eye protection is appropriate for the task
Eye and Face Protection Options

Basic safety glasses

Chemical and Vapour Resistant Safety Goggles
(no direct vent openings)

Impact-Only Resistant Safety Goggles
(Direct vent holes therefore not chemical splash and vapour resistant)

Face Shield
Biosafety @ the U of M

Containment Operational Practices:
Personal Protective Equipment

Masks and Respirators

• **N95 dust and mist respirators** protect only from particles /dust or aqueous mists that do NOT emit harmful vapors.

• **Cartridge Respirators** come as full or half face and may only be appropriate as a last resort for work with hazardous vapours when using a fume hood is not feasible. This is not a typical application in a research lab. Please Note:
  - *Respirators come with a variety of cartridges for work with biological and/or chemical material.*
  - *Use of a respirator (including N95 masks) requires a medical clearance and that the user be fit tested by the EHSO.*

• Consult with your supervisor and EHSO to determine the appropriate use of masks/respirators for your work. EHSO- call 474-6633
Respiratory Protection Examples

N95 Dust and Mist Respirators
(Must be fit-tested)

Half and Full Face Respirator
(Must be fit-tested)

Powered Air Purifying Respirator
(PAPR)
Biosafety @ the U of M

Containment Operational Practices:
Personal Protective Equipment

Every Lab MUST have the following available:

1. Lab coats.
2. Gloves (nitrile and latex or latex-like), chemically resistant and/or thermal resistant as appropriate.
3. Eye protection (individual safety glasses, laser eyewear, goggles and face shield as appropriate).
4. Respiratory protection (dust masks, respirator, N95 as based on a local risk assessment).
5. Functional fume hood with adequate space.

Fume hoods should NOT be a chemical or equipment storage area, or permanent radioactive workstations. If your hood lacks space to comfortably decant a 4L bottle of solvent into a beaker then it REQUIRES CLEANING (discuss with Principal Investigator / Supervisor)
Foot wear:

- Protective Footwear must be selected based on an LRA of the worksite and potential Hazards. (CBSG, Part I, 4.6.3)
- Footwear should protect the entire foot from hazardous liquids and be easy to clean and/or disinfect.
- Completely enclosed footwear with no heels or low heels are recommended to be worn in the containment zone to reduce the risk of exposure to infectious material or toxins in the event of an incident or accident.
- @ the U of M, in CL1 and CL 2 zones, completely enclosed footwear with no heels or low heels are **required** unless a documented LRA can show compelling evidence that this is not required.
- Shoes should have a closed toe and heel **and** cover the entire top of the foot. Ballet flats for women, and mesh runners, technically cover the toes and heel but do not enclose the top of the foot.
**Containment Operational Practices:**
Fume Hoods & Laminar Flow Hoods are not BSCs

**Fume Hoods**
Draw air from the lab through an opening in the sash. Contaminated air is expelled out an exhaust duct on the roof of the building. There is generally NO filtration of contaminated air. U of M air flow standards require a face velocity of 80-120 lfm at a sash height of 11in (30cm). **Look for the safe operating stickers found to the side of the glass sash.**

**Protection:**

- PERSONAL ✓
- Sample or product X
- Environmental (outside) X

**Uses:**
Laboratory work involving poisonous, corrosive, odorous or flammable chemicals (if appropriate).

**General Rules:**
- Work with the sash height indicated on the sticker
- Work at least 15cm (6”) behind the face of the sash
- Do not block the rear baffles
- Do not use the fume hood to dispose of solvents by evaporation
- Do not use for general chemical storage
**Containment Operational Practices:**
Fume Hoods & Laminar Flow Hoods are not BSCs

**Laminar Flow Hoods**
Sometimes also called **clean benches**, these are specially designed cabinets that provide HEPA filtered laminar flowing air over the work space and into the room. Can be vertical or horizontal laminar flow hoods. Do not confuse horizontal models with BSCs.

**Protection:**

<table>
<thead>
<tr>
<th>Protection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal</td>
<td>X</td>
</tr>
<tr>
<td>SAMPLE OR PRODUCT</td>
<td>√</td>
</tr>
<tr>
<td>Environmental(outside)</td>
<td>X</td>
</tr>
</tbody>
</table>

**Uses:**
For lab work requiring a sterile environment. For example media preparation or plant culturing is fine but NOT human or animal tissue or cell culturing.

**General Rules:**
- Don’t disrupt laminar flow by blocking vents, overcrowding, by rapid lateral movements within or outside the hood.
- Don’t use with chemicals or ≥RG2 infectious material.
- Don’t disinfect with bleach alone unless followed with appropriate rinse. Bleach corrodes stainless steel.
Containment Operational Practices: Fume Hoods & Laminar Flow Hoods are not BSCs

Biological Safety Cabinets (BSC)

• Information on the safe use of BSCs is covered in detail in the e-learning Module: Biological Safety Cabinets. U of M follows the guidelines discussed in the module.

• All BSCs at the U of M must be certified when first received and then annually thereafter or at anytime after they are moved.

• EHSO maintains a database of BSCs. Certifiers provide the certification reports to EHSO. Refer to the information in the following link: Certifying BSCs at the U of M.

• All cabinets must be formaldehyde decontaminated before moving or prior to disposal.

Protection: (Note: Virtually all of the BSCs at the U of M are Class II BSCs)

PERSONAL ✓
SAMPLE OR PRODUCT ✓
ENVIRONMENTAL(OUTSIDE) ✓

Uses:
Aerosol producing procedures when working with Risk Group 2 biological agents.

General Rules:
• Don’t disrupt laminar flow by blocking vents, overcrowding, by rapid lateral movements within or outside the hood, or by using a flame
• Don’t use with toxic volatile chemicals
• Don’t operate with UV light engaged
• All biological waste used in a BSC must be packaged or disinfected before removing.
**Containment Operational Practices:**
**Biological Safety Cabinets Work Layout**

This is a typical layout for working "clean to dirty" within a Class II BSC. Clean cultures (left) can be inoculated (center); contaminated pipettes can be discarded in the shallow pan and other contaminated materials can be placed in the biohazard bag (right). This arrangement is reversed for left-handed persons.

ALL biohazardous material must be packaged/contained OR disinfected before being removed from the BSC.

Taken from: [http://www.cdc.gov/od/ohs/biosfty/bsc/bsc.htm#contents](http://www.cdc.gov/od/ohs/biosfty/bsc/bsc.htm#contents)
Containment Operational Practices:
Vacuum Flask Set-up

Vacuum Flask Set-up

Mandatory in CL2 labs @ U of M

The collection and trap flask should be placed in secondary containment!
Quick Note
Bleach and Stainless Steel

Bleach (sodium hypochlorite) will corrode stainless steel if left in contact for an extended time.

To clean stainless steel equipment (BSC, incubators, water baths, sinks) use 70% ethanol or other non-corrosive disinfectant.

If you must use bleach to clean stainless steel equipment be sure to rinse off all the bleach with water.
Biosafety @ the U of M

Containment Operational Practices: Waste Disposal

General Guidelines

• Segregate Biological from Chemical from Radioactive waste at source.

• NO sink disposal of chemicals. (with very limited exceptions as per U of M waste disposal chart)

• Develop waste disposal procedures before starting work.

• Generation of mixed waste (e.g. radioactive and biological) may need special procedures and approval.

• Questions should be directed to Joey Bellino, Assistant Environmental Management Coordinator, at UM EHSO 474-6970
Biosafety @ the U of M

Containment Operational Practices:
Waste Disposal

Types of Waste – Sort and Segregate

- **Glass/Sharps**
  Anything that can puncture the skin. This includes broken glass, rigid plastic tips, pasteur pipettes, microscope slides

- **Chemical**
  solid and liquid

- **Biohazardous / Biomedical material** (waste chart follows in the next slide)
  solid, liquid, sharps including all needles, syringes, razor and scalpel blades

- **Radioactive material**
  solid and liquid

- **Laboratory equipment**
  e.g. centrifuges, incubators, refrigerators, freezers
**University of Manitoba**

**Biohazardous Waste Disposal Guidelines**

This Waste chart is intended for reference for the disposal of Items contaminated ONLY with Biohazardous materials (see U of M “Biosafety Guide” for definition and details or consult EHSO 474-6633).

All Biohazardous Waste must be appropriately Decontaminated/Treated before disposal.

**MATERIAL WITH RADIOACTIVE OR CHEMICAL RESIDUES SHOULD NOT BE AUTOCLAVED**

Contact the Environmental Health and Safety Office (474-6633) before generating mixed waste items i.e. contaminated with biological and radioactive or chemical residues.

- Remove Biohazard Log Tape after autoclaving
- Place in Dark Garbage Bags
- Dispose of with Caretakers

### Items To Be Disposed

| 
| 
| 

#### Solids
- e.g. Petri Dishes, Plastic Culture flasks, bench paper, gloves

- For Items with Biological Contamination Only

- Place in Plain Clear Autoclave Bags
- Add Autoclave Tape to bag as indication of decontamination status

- Remove Biohazard Log Tape after autoclaving
- Place in Dark Garbage Bags
- Dispose of with Caretakers

#### Biomedical Sharps
- e.g. All Needles, Syringes, Scalpel or Razor Blades

- Radioactive contamination Only

- Dispose of into a rigid, puncture resistant, container with a secure lid.
- Label the hazard appropriately.

- None

- Give to EHSO Hazardous Waste Coordinator for disposal

- Chemical Contamination Only

- Biological Contamination Only

- - Any Type

- Dispose of into an Approved, Autoclavable Appropriately Labeled Sharps Container

- - Add Autoclave Tape to container as indication of decontamination status

- - Label with Biosafety Permit & Initial

- - Give to EHSO Hazardous Waste Coordinator for disposal

- Glass and other sharps with the potential of puncturing skin e.g. microscope slides, glass pasteur pipettes, rigid plastic pipette tips

- Contaminated with Human or Animal Blood, Body Fluids or Tissue

- - Collect in a reusable rigid puncture resistant autoclavable container.
- - Label with Biohazard Log Tape
- - Dispose of with caretakers

- Other Biological Contamination Only

- - Collect in plastic bag lined sturdy cardboard box
- - Seal well
- - Label as “Broken Glass”
- - Dispose of with caretakers

- Liquids

- Biological Contamination Only

- - No chemical or radioactive hazards

- - Remove Biohazard Log Tape
- - Dispose as appropriate for volume or decontaminate with a proven chemical method

- - Package in plastic bag lined sturdy cardboard box
- - Seal well
- - Label as “Broken Glass”
- - Dispose of with caretakers

- Pathological Waste

- e.g. Animal Carcasses

- Consult with Radiation Safety Manual, Central Animal Care Services/Manual and your department for any special directives

- - Double bag and store in designated freezer for pick-up and incineration.

---

*Charts should be posted in all labs listed on a Permit holder’s Biosafety Permit.*

Available on the Biosafety program web-site:

**Biohazardous Disposal Chart**
Containment Operational Practices: Waste Disposal

Biohazardous Waste: Solid and Dry

*PLEASE Pay Special Attention to these slides on Waste Disposal!

BEFORE you start working, know how you will dispose of your items and have appropriate, clearly labeled containers available.

- If you *don’t* autoclave your waste at the end of every day, your biohazardous waste container /support stand should have a lid. A container or support stand with a step-on-mechanism (hands-free) is required.

- Aspirate or pour off all liquids before disposing of the item in an autoclave bag. For example, if you have extra cell suspensions, tissue culture media or supernatants, treat these with the appropriate concentration of chemical disinfectants or autoclave instead.

*Card board boxes are not an appropriate support stand for biohazard container. They cannot be disinfected.*
Containment Operational Practices: Waste Disposal

Biohazardous Waste: Solid and Dry (continued)
What can go into an autoclave bag?

Typical biohazardous waste to go into an autoclave bag includes for example:

- used petri dishes,
- tubes & other plasticware,
- gloves,
- culture flasks,
- bench paper.

**BUT NOT:**
- Anything contaminated with chemicals or radio-isotopes
- Anything that can puncture the bag or skin
  for example: pipetteman tips; pasteur pipettes
**Containment Operational Practices:**

**Waste Disposal**

**Biohazardous Waste: Solid and Dry (continued)**

- Fill the bag only to the level where it can be loosely closed, typically 2/3 full.  *During autoclaving the bag must be open enough to allow steam to access contents!*  
- **Label it** and submit for autoclaving. NOTE: Autoclave tape will only indicate if the item has been processed, not that the contents are sterilized.  
- Place the autoclave bag in secondary containment when transporting in public hallways or moving between floors.  *The secondary container should have a secure lid, be disinfectable and have a biohazard sign on it.*  
- After autoclaving place in a dark, opaque, garbage bag, tie it shut and dispose as regular garbage with the caretakers.

- Fill only 2/3 full  
- Tape shut and label  
- Over pack with dark garbage bag  
- Final disposal in Regular garbage  

*Validate autoclave effectiveness with biological indicators*
Containment Operational Practices:
Waste Disposal

Biohazardous Waste: Sharps
(To be disposed in an ‘approved’ sharps container)

Items to be disposed in an “approved” sharps container include ALL of the following:

1. Needle & syringes, scalpel or razor blades
2. Sharp items which could potentially puncture the skin and are contaminated with human / animal tissue, fluids or blood

An “approved” sharps container is:
- rigid,
- puncture-resistant, [biohazard symbol]
- appropriately labeled, [radioactive symbol]
- autoclaved if biologically contaminated
- discarded through the EHSO

DO NOT:
X - remove needles from syringe or recap
X - bend needles
X - overfill containers – that is, NOT MORE THAN ¾ FULL
X - autoclave chemically or radioactively contaminated sharps. These are placed in separate containers, labeled appropriately and given to the EHSO.
For other potential sharps contaminated with *microbiological substances*: e.g. *bacteria, viruses and tissue cultures*

- Collect these in **rigid, puncture-resistant, autoclavable** containers.
- Containers can be **reusable**.
- Label the container with the Biohazard sign.
- Autoclave and dispose as regular glassware waste.

**Containment Operational Practices: Waste Disposal**

**Biohazardous Waste: Sharps** (continued)

**Examples of Other Potential Sharps**

(This does not include: blades, scalpels, needles & syringes, or anything contaminated with human or animal fluid)

**Containers should be:**
- Rigid,
- Puncture-resistant,
- Autoclavable
- Can be Reusable

**Autoclave minimum 1hr @ 121°C**

Discard as regular glassware waste
**Containment Operational Practices:**

**Waste Disposal**

**Biohazardous Waste: Liquids and Pathological**

**Liquid Biohazard Waste**
- Treat with a proven chemical method (e.g., bleach)
- OR - Autoclave @ 121°C as appropriate for volume
- Dispose in sink with lots of water

**Pathological Waste**
- Double bag and store carcasses and all related material in the freezers designated by Central Animal Care Services (CACS)

**Radioactive Pathological Waste**
- Requires pre-approval from Radiation Safety Program and CACS

**Pathological Waste**
(e.g., animal body parts and carcasses)
Containment Operational Practices:
Emergency Response Plans

U of M Emergency Contacts

Univeristy of Manitoba Emergency Phone Numbers (link to website)

U of M EMERGENCY QUICK REFERENCE (link to printable document)

eg. medical emergency, fire, assault, violence, traffic accident

At U of M
- Dial 555 OR 911 from any U of M telephone exchange (e.g. 474-, 789-, 975-)
  Dial 474-9341 from all other phones
- Dial #555 from any Roger’s or MTS cell phone

At HSC / CCMB (MICB)
- Dial 55 (not 911) from any 787 - telephone exchange

All 555 or 55 calls go directly to Security Services who will send the appropriate response and also accompany outside emergency vehicles to the correct location
Containment Operational Practices:
Emergency Response

Safety Showers and Eye wash Stations

1. Hands-free sink
2. Eyewash station- if it is located inside the lab, it must be flushed weekly by lab personnel
3. Safety shower
4. Fire Extinguishers
5. Smoke alarms
6. Sprinklers
Containment Operational Practices: Emergency Response Plans

Biohazardous Spill Response

• Spills should never be cleaned up by untrained staff.
• Caretakers are not allowed to clean up any lab spills.
• The best time to learn about and practice cleaning up a spill is before it happens.
• Every lab that contains controlled products should have a basic spill kit.
• Spill kit location and use must be known by all lab members.

There are two Spill Clean-up Protocol posted on the Biosafety Program website:

Helpful Note: Print spill clean-up procedures and put in a plastic sleeve and keep with your spill supplies.
Biohazardous Spill Response – General Guidelines

1. Restrict assess to area for 30 minutes to allow aerosols to settle.
2. Wear a lab coat, heavy spill kit gloves, safety goggles & other face protection if required.
3. Absorb all liquid with absorbent material in spill kit. Discard into double clear autoclave bags for autoclaving.
4. Sweep up or use forceps to pick up any broken glass. Discard in disposable biological sharps autoclave waste container.
5. Disinfect area with bleach or disinfectant for the appropriate time and then wash the spill area with warm soapy water.
6. Autoclave or disinfect and replace all cleanup equipment.
7. Refer to the detailed spill procedures on the Biosafety Program web-site (As per links on previous slide).
Containment Operational Practices: Emergency Response Plans

Basic Lab Spill Kit

The “Basic Lab Spill Kit” should include the following:

1) A five gallon pail with lid for kit storage or to act as a waste pail in the event of a spill.
2) Universal absorbent pad and granular absorbent.
3) Disposable and reusable chemically resistant gloves.
4) Non-vented splash goggles.
5) Caution tape and duct tape.
6) Sealed plastic transfer pipettes.
7) Dustpan and brush.
8) Disposal and autoclave bags.
Biosecurity Risk Assessments:
Permit Holder Responsibilities

As part of a PI or departmental biosafety manual, a risk assessment is required to evaluate the scope and specific requirements for biosecurity. If you need assistance with your local biosecurity risk assessment, refer to the CBSG, Part II, Chapter 6- Biosecurity and the PHAC e-learning modules ‘Biosecurity Risk and Classification’ and ‘Biosafety Program - Biosecurity Plan’.

Elements of a Biosecurity Plan:

- **Physical Security**
  - Keep laboratory doors closed and doors locked when unoccupied.
  - Keep all stocks of other organisms locked during off hours.
  - When research is completed for the day, ensure that chemicals and biological materials have been stored properly and securely.

- **Personnel Suitability and Reliability**

- **Infectious Material and Toxin Accountability**
  - Keep an accurate record of chemicals, stocks, cultures, project materials, growth media, and those items that support project activities.

- **Incident and Emergency Response**
  - Notify appropriate authorities (Security service and EHSO) if materials are missing.
  - Ask strangers (someone you do not recognize as a co-worker or support staff person) to exit the room if they are not authorized to be there.
  - Inspect all packages arriving at the work area.
General Lab &
Personal Safety
General Lab Spill Clean-up
Personal Safety
Working Alone Policy
Fire Safety
&
HOW TO SUBMIT YOUR QUIZ
Departmental Emergency Contacts and Safety Information

Labs / Departments must have safety and emergency information provided to ALL employees. See example below.

<table>
<thead>
<tr>
<th>Lab Location: Rm 807-808 BMSB</th>
<th>Dept. Radiation Coordinator: Dr. Isaac Aymhot 789-3333</th>
</tr>
</thead>
<tbody>
<tr>
<td>PI: Dr. Robert Safety 789-2121</td>
<td>MSDS Location: North bookcase Rm 807b</td>
</tr>
<tr>
<td>Fire Extinguisher Hallway by Room 123</td>
<td>Fire Wardens: Mr. Donny Flame 789-2133</td>
</tr>
<tr>
<td>Fire / Medical Emergency 555</td>
<td>Dr. Johnny Nitro 789-2124</td>
</tr>
<tr>
<td>UM EHSO (Environmental Health &amp; Safety Office) CHEMICAL / RADIATION / BIOHAZARD 8:30am-4:30pm 474-6633 Outside Regular Hours 474-9341 (MICB -also call HSC security 74567)</td>
<td>SAFETY INFO &amp; FIRST AID KIT: Hallway outside Rm 808</td>
</tr>
<tr>
<td>Dept. WHMIS Coordinator: Mr. Martin Keener 789-2122</td>
<td>SPILL KIT Locations: Under sink Rm 807</td>
</tr>
</tbody>
</table>
General Lab Safety: Spills - General Guidelines

Glassware Breakage

- Glassware Breakage
  - Non-hazardous Liquids & Solids
  - Hazardous Liquids & Solids
  - Biohazardous material
  - Radioactive material

Sweep up broken non-contaminated glass and discard as glassware waste.
General Lab Safety: Spills - General Guidelines

Non-Hazardous Liquids and Solids

1. Wear a lab coat and spill kit gloves and dust mask (if necessary).

2. Sweep up solid chemical and broken glass and discard in a waste container labeled with the UM waste tag. Once done, cap and arrange for disposal via U of M EHSO.

3. For liquids, absorb with spill kit absorbent or paper towels or with a mop and discard in a waste container labeled with the UM waste tag. Arrange with UM EHSO for disposal. Wash the area with warm soapy water.

4. Clean and replace all cleanup equipment.
General Lab Safety: Spills - General Guidelines

Hazardous Chemical Spills

- Glassware Breakage
- Non-hazardous Liquids & Solids
- Hazardous Liquids & Solids
- Biohazardous material
- Radioactive material

You will **NOT** attempt to clean up the spill:

1) If you are unaware of the composition of the spill.
2) If the spill involves more than one chemical.
3) If the cleanup is beyond your capabilities.

If possible to do safely, contain the spill using the special absorbent pad from the spill kit and then call UM EHSO or your emergency contacts for assistance.

**Life threatening situation can ONLY be handled by WFPS. Call 555 or 55(MICB).**
General Lab Safety: Spills - General Guidelines

Hazardous Chemical Spills

- Glassware Breakage
- Non-hazardous Liquids & Solids
- Hazardous Liquids & Solids
- Biohazardous material
- Radioactive material

1. Wear a lab coat, spill kit gloves, safety goggles & appropriate respiratory protection.
2. For solids, sweep up chemical and broken glass and discard in waste pail.
3. For liquids, absorb with spill kit absorbents and discard in waste pail.
4. Once all waste has been collected, cap the waste pail, label with the U of M waste tag and arrange for disposal via UofM EHSO.
5. Wash spill area with warm soapy water. If spilled chemical reacts with water seek assistance from EHSO.
6. Clean and / or replace all cleanup equipment.

Incident Report
General Lab Safety:
Spills - General Guidelines

Radioactive Spills

1. Minimize contaminated area,
2. Minimize amount of waste.
3. Do not spread accidentally.
4. Wear a lab coat and disposable latex or nitrile gloves.
5. Absorb spill with minimal absorbent material.
6. Clean area with damp towel from outside in, monitoring success of cleanup.
7. Discard all soiled materials as radioactive waste (yellow tags)
8. All large spills MUST be reported to EHSO’s Leona Page or Alison Yarmill
General Lab Safety: 
Spills - General Guidelines

Getting Help from EHSO

- Glassware Breakage
- Non-hazardous Liquids & Solids
- Hazardous Liquids & Solids
- Biohazardous material
- Radioactive material

You should get help from EHSO:

1) If you are unaware of the composition of the spill.
2) If the spill involves more than one chemical.
3) If the cleanup is beyond your capabilities.

Where possible, apply spill kit absorbent material, clear and secure the area and call:

UM Environmental Health and Safety
474-6633 (8AM-4PM) or 474-9341 or 555 [UM] or 55 [HSC] (non-working hrs)

Life threatening situation can ONLY be handled by WFPS. Call 555 or 55(MICB).
Personal Safety

Code Blue Station

• Provide 24/7 instant voice connection to Security Services
• Officer will automatically be sent and arrive in under 2 minutes
• Strategically placed at both campuses

Safewalk Program

Call 474-9341

• For students, faculty, and staff
• Available at BOTH campuses,
• Provides a safe walk to your car or other building at night. (A student patrol with specially marked security vests or a uniformed Security Services Officer )
Personal Safety

Other safety resources

- **Red Emergency Buttons**: are available in certain buildings and tunnels. Pushing the red button will alert Security Services that an emergency exists at that location.
- **New Red Call Boxes**: are two-way communication boxes with Security Services.
Departmental Working Alone Policy

Review your Department’s “Working Alone Policy”

Workplace Safety and Health Act recognizes that certain workplaces require staff to work alone and therefore requires that a plan is in place that is agreeable to both the employer and employee. The plan should be based on a realistic risk assessment of the hazards under the circumstances and include a written emergency response plan.

Policies might include:

- Mandate buddy system where staff and students must work in pairs.
- Supervisor notification before starting work after hours.
- Restrictions to certain types of work.
- Restrictions to certain employees or employees with specific training.
- Mandatory use of “Safewalk” service to get to your car.
Fire Safety

• *The law requires that everyone leaves the building during a fire alarm.*

• Get to know the alarm bell scenarios in any of the buildings where you work.

• When you hear a fire alarm you should turn off all flames and gas sources and prepare to exit the building via the stairway. **Discuss and plan emergency response with your supervisor ahead of time.** Know what to do if you are in the middle of an experiment. If required, call EHSO (474-6633) for assistance with your plans.

• If you need personal assistance proceed to the nearest stairway and await the FIRE WARDEN. The fire warden for the floor will usually be wearing a RED neck pouch that says **FIRE WARDEN**.

*Contact your Departmental Office for departmental fire safety information / training and fire warden information.*
Know Your Fire Alarm & Extinguisher Location
Submitting Your Biosafety Quiz

Thank you for completing the University of Manitoba Generic Biosafety Course.

- You must now complete and submit the Biosafety Quiz found on the [Biosafety Training website](#).
- The quiz is totally based on the PHAC e-learning modules and this presentation.
- The pass mark is 80%.

Submit the signed hard-copy Quiz to:

Steve Cole, Institutional Biosafety Officer  
c/o Environmental Health and Safety Office  
T248B Basic Sciences Building  
Bannatyne Campus